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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/684,088	10/12/2003	Martin M. Liphardt		3036

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EXAMINER	
AKANBI, ISIAKA O	

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 06/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/684,088	LIPHARDT ET AL.	
	Examiner	Art Unit	
	Isiaka O. Akanbi	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 March 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Amendment

The amendment file 20 March 2006 has been entered into this application. Claims 19 and 20 are cancelled.

Drawings

The examiner approves the drawings filed October 12th, 2003.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4, 6-9 and 13-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over of Xu et al. (6,590,656) in view of Ono (6,259,174).

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over of Xu in view of Ono. The reference of Xu discloses the features of the claim 1, comprising a pivot mounted stage/sample (14)(fig. 1A), a means (14) for imparting translation motion to said pivot mounted stage/sample substantially along a perpendicular to a surface thereof (Page 3, Par. 0036, line 5-6)(fig.1) in a "Z" direction, a first source (22) of a first beam of electromagnetic radiation in functional combination with a multi-element alignment detector comprised of at least two detector (34/60) (fig. 1A) elements closely surrounding a hole there through and a second source of a second beam (30) (fig. 1A) of electromagnetic radiation comprising a polarization state generator (28) and a data detector (40) comprising a polarization state detector (34)(page 5, par. 0048). Further the reference of Xu discloses said first source (22) of a first beam of electromagnetic radiation being oriented so as to provide a first beam of electromagnetic radiation through said hole in said multi-element alignment detector (fig. 1A), said pivot mounted stage/sample (14) being positioned to receive said first beam of electromagnetic radiation substantially along a normal to a surface of said pivot mounted stage/sample via said hole said

multi-element alignment detector (Page 3, Par. 0036, line 1-9)(fig.1), said second source of electromagnetic radiation being positioned to provide a beam (30) of electromagnetic radiation and direct it to the surface of said sample at an oblique angle thereto (fig. 1A), such that said second beam of electromagnetic radiation reflects from said surface of said pivot mounted stage/sample (12c)(fig. 1A) (Page 3, Par. 0036, line 1-9), said first and second electromagnetic beams being oriented with respect to one another at a known angle (fig. 1A) (Page 3, Par. 0036, line 6-9), said pivot mounted stage/sample (14) being mounted to said means for imparting translation motion such that said pivot mounted stage/sample can be caused to move substantially along a perpendicular to the surface thereof in a "Z" direction, such that the reflected second beam (30) of electromagnetic radiation enters said data detector (40))(fig. 1A) (Page 3, Par. 0036, line 2-9), furthermore, the reference of Xu show moving the stage (fig. 1) and suggested stage rotation (page 1, par. 0009). However the reference of Xu is silent regarding the stage degrees of freedom/motion. The reference of Ono teaches of six degrees of freedom/motion stage (col. 13, line1-21). Therefore it would have been obvious to one having ordinary skill in the art at the time of invention to incorporate the teachings of Ono in conjunction with XU to provide a pivot mounted stage/sample which is rotatable about "X", "Y" and "Z" axes for the purpose of improved focus for alignment.

As to claims 2 and 7, the reference of Xu discloses the features of claim 2, comprising the steps of: a) providing a pivot mounted stage/sample (14)(fig. 1A) and a means for imparting translation motion to said pivot mounted stage/sample substantially along a perpendicular to a surface thereof (Page 3, Par. 0036, line 5-6)(fig.1) in a "Z" direction, a first source (22) of a first beam of electromagnetic radiation in functional combination with a multi-element alignment Detector comprised of at least two detector (34/60) elements closely surrounding a hole there through and a second source of a second beam (30) (fig. 1A) of electromagnetic radiation comprising a polarization state generator (28) and a data detector (40) comprising a polarization state detector (34)(page 5, par. 0048). Further the reference of Xu discloses said first source (22) of a first beam of electromagnetic radiation being oriented so as to provide a first beam of electromagnetic radiation through a hole in said multi-element alignment detector (Page 3, Par. 0036, line 28-30)(fig.1), said pivot mounted stage/sample first beam of electromagnetic being positioned to receive said radiation substantially along a normal to a surface (12c) of said pivot mounted stage/sample via said hole in said multi-element alignment detector (see fig. 1A), said second source of a second beam (30) of electromagnetic radiation being oriented such that a

beam of electromagnetic is provided thereby at an oblique angle to the surface (12c) of said sample (fig. 1A), said first and second electromagnetic beams being oriented with respect to one another at a known angle (see fig. 1A), b) causing a first beam of electromagnetic radiation from said first source of a first beam of electromagnetic to pass through said hole in the multi-element alignment detector such that said first beam of electromagnetic radiation reflects from the surface of said pivot mounted stage/sample (Page 4, Par. 0039, line 11-13)(fig.1), c) pivoting said sample about said stage/sample (14) pivot mounting about at least one of the "X" and "Y" axes until signals from all of the detector detector elements in the multi-element alignment detector are substantially minimized or equalized, indicating that said first beam of electromagnetic radiation approaches said surface of said sample substantially along a normal thereto (fig. 1A)(Page 3, Par. 0039, line 13-17), d) causing said second source of electromagnetic radiation to provide a second beam (30) of electromagnetic radiation and direct it to the surface (12c) of said sample at an oblique angle thereto, such that said second beam of electromagnetic radiation reflects from said surface of said pivot mounted stage/sample (fig.1) and e) optionally causing said pivot mounted stage/sample to undergo translation motion substantially perpendicular (z axis, see fig. 1A) to the surface of said sample in the "z" direction via said means for imparting translation motion to said pivot mounted stage/sample (Page 3, Par. 0036, line 5-6)(fig.1) in the "Z" direction; such that the reflected second beam of electromagnetic radiation is directed to enter said data detector (40). The reference of Xu shows moving the stage (fig. 1) and suggested stage rotation (page 1, par. 0009), however the reference of Xu is silent regarding the stage degrees of freedom/motion. The reference of Ono teaches of six degrees of freedom/motion stage (col. 13, line1-21). It would have been obvious to one having ordinary skill in the art at the time of invention to incorporate the teachings of Ono in conjunction with XU to provide a pivot mounted stage/sample which is rotatable about "X", "Y" and "Z" for the purpose of improved focus for alignment.

As to claims 3 and 8, Xu and Ono discloses everything claimed, as applied to claim 2 above, in addition Xu discloses wherein the steps c. and e. are automated (Page 4, Par. 0040).

As to claims 4, 9, 16, 17 and 18, Xu and Ono discloses everything claimed, as applied to claims 2 and 7 above, in addition Xu discloses a method which comprises repeating the method at another/different location on the sample (fig. 1B)(Page 3, Par. 0036, line 6-9).

Regarding claim 6, the reference of Xu discloses a system for aligning a sample comprising a pivot mounted stage/sample (14), a means (14) for imparting translation motion to said pivot mounted stage/sample substantially along a perpendicular to a surface (12c) thereof (fig. 1A) (Page 3, Par. 0036, line 5-6) in the "z" direction, a first source (22) of a first beam of electromagnetic radiation in functional combination with a beam splitter (52/62) and a multi-element alignment detector comprised of at least two detector (34/60) elements (fig. 1A), a second source of a second beam (30) of electromagnetic radiation comprising a polarization state generator (28) and a data detector (40) comprising a polarization state detector (34)(page 5, par. 0048). Further the Xu reference of Xu discloses said first source (22) of a first beam of electromagnetic radiation being oriented so as to transmit a first beam of electromagnetic radiation through said beam splitter (52)(fig. 1A), said pivot mounted stage/sample (14) being positioned to receive said first beam of electromagnetic radiation substantially along a normal to a surface of said pivot mounted stage/sample via said beam splitter (52/62)(fig. 1A), said multi-element alignment detector being positioned to receive electromagnetic radiation reflected from said surface (12c) of said sample which is reflected from said beam splitter (52/62)(fig.1A), said second source of electromagnetic radiation being positioned to provide a second beam (30) of electromagnetic radiation and direct it to the surface (12c) of said sample at an oblique angle thereto, such that said second beam (30) of electromagnetic radiation reflects from said surface of said pivot mounted stage/sample (fig. 1A), said first and second electromagnetic beams being oriented with respect to one another at a known angle (see fig. 1A), said pivot mounted stage/sample (14) being mounted to said means (14) for imparting translation motion such that said pivot mounted stage/sample can be caused to move substantially along a perpendicular (z axis) to the surface thereof in the "Z" direction, such that the reflected second beam (30) of electromagnetic radiation enters said data detector (40))(fig. 1A) (Page 3, Par. 0036, line 2-9). The reference of Xu shows moving the stage (fig. 1) and suggested stage rotation (page 1, par. 0009), however the reference of Xu is silent regarding the stage degrees of freedom/motion. The reference of Ono teaches of six degrees of freedom/motion stage (col. 13, line1-21). It would have been obvious to one having ordinary skill in the art at the time of invention to incorporate the teachings of Ono in conjunction with Xu to provide a pivot mounted stage/sample which is rotatable about "X", "Y" and "Z" axes for the purpose of improved focus for alignment accuracy.

As to claim 13, 14 and 15, Xu and Ono discloses everything claimed, as applied to claims 2, 3 and 7 above, in addition Xu discloses wherein a method of aligning a sample in which the first and second beams of electromagnetic radiation from the first and second sources of electromagnetic radiation to both impinge on the sample surface at substantially the same spot (see fig. 1A).

Claims 5, 10, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over of Xu et al. (6,590,656) in view of Ono (6,259,174), further in view of Rosencwaig et al. (6,297,880 B1).

Claims 5, 10, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over of Xu et al. (6,590,656) in view of Rosencwaig et al. (6,297,880 B1), as applied to claims 2, 7, 1 and 6. The reference of Xu and Ono discloses of the features of claims 5, 10, 11 and 12, comprising multi-element alignment detector, however the reference of Xu and Ono is silent regarding the type of detector as being a quad detector comprising four detector elements. The reference of Rosencwaig teaches of quad detector with four radially disposed quadrants (col. 5, line 20-25). It would have been obvious to one having ordinary skill in the art at the time of invention to use quad detector for the purpose of monitoring periodically the changes in the position of the reflected probe beam.

Additional Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Phillips (4,742,376) discloses a stage with six degrees of freedom/motion for aligning a sample. Further the references listed in the attached form PTO-892 teach of other prior art alignment devices that may anticipate or obviate the claims of the applicant's invention.

Response to Arguments

Applicant's arguments with respect to all pending claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Fax/Telephone Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Isiaka Akanbi whose telephone number is (571) 272-8658. The examiner can normally be reached on 8:00 a.m. - 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley Jr. can be reached on (571) 272-2059. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Isiaka Akanbi
June 11, 2006

LAYLA G. LAUCHMAN
PRIMARY EXAMINER